

empty and some identified as containing a substance, "Mobil Steam Turbine Oil" and "Frekote") and two containers in 1994. A review of the VOCs identified in the groundwater to date reveals that monitoring wells CJ-4S and CJ-4D, located north of the Operations Building, contain chlorinated compounds, including the highest concentration of trichloroethene, suggesting that this location was a former source of chlorinated compounds to the subsurface environment.

- ◆ No documented or reported releases of chlorinated VOCs were found for the immediately adjacent and occupied properties east of JJA, i.e., Alliant Metals and Land & Sea.
- ◆ A source of MTBE appears to be the associated with the former MTBE UST that was located at Land & Sea.
- ◆ Land & Sea. This establishment is considered to be a source or the primary source of MTBE in the groundwater at the Site since no other source has been identified to date. A release of MTBE to soil has been documented from a former 1,000-gallon UST located east of the Land & Sea building. This release was encountered during the removal of the UST in September 1996. Although the results of soil excavation subsequent to the tank removal did not reveal detectable levels of VOCs, subsequent testing of Land & Sea's supply well along with supply wells at Alliant Metals and JJA by NEET revealed the existence of MTBE. The concentration of MTBE in the Land & Sea supply well was reported as high as 268 ug/l in 1997. Since bedrock was encountered at a depth of approximately 5 to 8 feet below grade in the soil excavation, the shallow depth to bedrock offers a relatively direct migration pathway for a release of MTBE to the bedrock regime.

Groundwater flow patterns identified at the Site in the overburden materials indicate a westerly flow of groundwater. Groundwater flow in the upper bedrock at the Site appears to be radial and centered in the vicinity of monitoring well CJ-2. The primary flow directions in the

upper bedrock system on the eastern portion of the Site appear to be northeasterly and southwesterly, with secondary flow to the northwest and southeast. However, flow patterns in the overburden and the upper bedrock systems may vary due to various hydraulic influences.

- ◆ A source of other petroleum-related compounds such as benzene, naphthalene; 1,2,4-trimethylbenzene; and MTBE identified in ATC-2, which had been located adjacent to a storm drain catch basin, may be attributed to surface runoff from the paved parking areas that could have had minor and accidental releases of oil, gasoline, and/or diesel fuel from vehicles.

5. *Evidence of Natural Attenuation of VOC*

- ◆ Based on the laboratory testing results to date (essentially two rounds of testing), trends in contaminant concentrations, TEAs and biodegradation byproducts cannot be effectively evaluated. However, it appears that some primary evidence of VOC degradation is occurring based on the occurrence of certain VOCs in the groundwater at the Site.

9.2 Recommendations

Cushing & Jammallo offers the following recommendations based upon our findings and conclusions:

1. Consideration of natural attenuation as the remedial option for the VOC contaminated groundwater at this Site. However, additional data is necessary to support this passive alternative as an effective remedial option and potentially forgo the need for the preparation of a Remedial Action Plan (Env-Wm 1403.08).

Implementation of additional rounds of groundwater sampling (using low flow sampling techniques) and testing from existing supply and monitoring wells will supply data to evaluate the presence of on-going natural attenuation processes or absence of such processes. This data will be combined with the existing data. Primary evidence of natural attenuation will include concentration trends over time such as decreasing

concentrations of primary VOCs, the presence and increasing concentrations of degradation products, decreasing trends in TEA (dissolved oxygen, nitrate, and sulfate) concentrations, and increasing trends in concentrations of soluble manganese, ferrous iron, and methane. Wells to be included in the monitoring program include:

- ◆ Supply Wells: JJA Supply Well 1, Supply Well 2, and Supply Well 3; Alliant supply well, and Land & Sea supply well (note that the Land & Sea supply well has not previously been a part of the sampling program instituted by JJA). Permission to sample both the Alliant well and the Land & Sea well will have to be obtained. It is further recommended that additional taps be placed at appropriate locations within the water distribution systems associated with JJA Supply Well 1 and JJA Supply Wells 2 so that samples may be collected prior to treatment.
- ◆ Monitoring wells: ATC-2, ATC-3, ATC-4-2, CJ-1, CJ-2, CJ-3, CJ-4S, and CJ-4D.

Recommended groundwater sampling frequency and testing parameters are as follows:

- ◆ Sampling over a period of two years at a frequency of three times per year (total of six sampling rounds);
- ◆ Testing parameters for each sampling round shall consist of the following:
 - ◆ Field testing of pH, temperature, specific conductance, dissolved oxygen and oxidation-reduction potential.
 - ◆ Laboratory testing of VOCs by EPA Method 8260B. It is not recommended that TICs be evaluated during these additional testing rounds since the concentrations of previously identified TICs appear to be relatively low, where quantified or estimated, and no NHDES standards exist for the identified TICs.
 - ◆ Laboratory testing of nitrate, sulfate, methane, ferrous iron, soluble manganese, chloride, and total organic carbon.

The depth to water in each monitoring well should be measured, recorded, and converted to groundwater elevations for each sampling round. Groundwater contour maps should be prepared and the Groundwater Management Zone limits should be re-evaluated for at least three of the six sampling rounds, including rounds reflecting low and high groundwater levels, to evaluate flow patterns in the overburden and bedrock groundwater systems.

2. Sampling and testing of water that discharges from internal faucets at JJA's Operations Building where the likelihood exists for JJA employees to come in contact with VOC impacted water and volatilization of VOCs from the water. Laboratory testing of samples should consist of VOCs by EPA Method 8260B. Subsequent to this testing, the results should be evaluated for risks to human health.
3. Performance of a Risk Characterization in accordance with the NHDES' "Risk Characterization and Management Policy" to evaluate the risk of harm to human health and the environment that exists at the Site due to the contaminants in the groundwater. The risk characterization should be performed subsequent to the completion of recommendations 1 and 2 above and incorporate the data presented herein and in the former ATC report. The results of the risk characterization should be used to evaluate how any risks will be addressed, to determine if additional response actions are necessary, and whether remedial action, other than a natural attenuation alternative, is necessary.

10.0 LIMITATIONS

The substance, content, and findings of documents and/or other deliverables made to JJA including but not limited to reports, data, memorandums, and facsimiles, are for the sole use of JJA. No reliance for the data or findings contained in these deliverables may be extended to any third party without the express written consent of Cushing & Jammallo. Any unauthorized use or distribution of Cushing & Jammallo's work shall be at JJA's and recipient's sole risk and without liability to Cushing & Jammallo.

This Site Investigation report presents conditions observed at the Site on the day or days of Cushing & Jammallo's site visit only. Cushing & Jammallo makes no conclusions regarding areas at the Site that were inaccessible or obstructed from view during these visits. The information presented in this report

is based on our observations in the field at the time of our Site visit; a review of reasonably ascertainable documents and data; interviews with certain designated personnel; and a review of available agency files, as referenced herein. Cushing & Jammallo does not warrant or guarantee the accuracy, completeness, and/or current status of the information contained in the environmental record sources for this Study. Such information is the product of independent investigation by parties other than Cushing & Jammallo and/or information maintained by government agencies. Therefore, no representation concerning agency records, other than those described herein, is expressed or implied.

The scope of this Site Investigation did not include determining the current compliance status of the Site with regard to all environmental regulations and/or permitting requirements. Any comments in the report regarding compliance with environmental regulations are provided for JJA's information, and should not be considered a thorough review of all environmental regulatory requirements.

Cushing & Jammallo did not perform testing or analysis to determine the presence or concentration of asbestos-containing material (ACMs), lead-based paint, radon, or polychlorinated biphenyls (PCBs) at the Site or in the environment at the Site. Any comments in the report regarding these substances or materials are limited to the obvious presence of certain thermal system insulation(s), surfacing materials, and miscellaneous materials that are readily accessible and apparent, are provided for JJA's information only, and cannot be used to determine the actual presence of the contaminants and/or compliance with applicable regulations. Further, studies of indoor air quality, occupational health and safety, and wetlands, which require specialized expertise, were not requested and were not included as part of this Site Investigation. As a result, without a comprehensive sampling and analysis program or implementation of services beyond the original scope of work, certain potential conditions may not be revealed.

This Site Investigation was a limited and non-exclusive assessment that was intended to evaluate subsurface conditions on specific portions of the Site. Borings were advanced and groundwater monitoring wells were installed at a limited number of locations on the subject property. Analysis was limited to soil samples obtained from certain borings and groundwater obtained from constructed monitoring wells and existing supply wells and those parameters specifically analyzed and noted in this report. It should be noted that subsurface conditions in other portions of the subject property not sampled by Cushing & Jammallo may differ from those that were sampled. Conclusions and recommendations in this report are based on information obtained from these installations and sampling efforts and applicable state regulations and guidelines.

Any qualitative or quantitative information regarding the Site which was not available to Cushing & Jammallo at the time of this assessment may result in a modification of the representations made in this report.

11.0 REFERENCES

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TABLES

Table No.	Process	Control System	Control Element	Control Action	Control Result
1	Temperature Control	Self-Regulating	Temperature Sensor	Temperature Control	Temperature Control
2	Pressure Control	Self-Regulating	Pressure Sensor	Pressure Control	Pressure Control
3	Flow Control	Self-Regulating	Flow Sensor	Flow Control	Flow Control
4	Level Control	Self-Regulating	Level Sensor	Level Control	Level Control
5	Speed Control	Self-Regulating	Speed Sensor	Speed Control	Speed Control
6	Position Control	Self-Regulating	Position Sensor	Position Control	Position Control
7	Force Control	Self-Regulating	Force Sensor	Force Control	Force Control
8	Power Control	Self-Regulating	Power Sensor	Power Control	Power Control
9	Energy Control	Self-Regulating	Energy Sensor	Energy Control	Energy Control
10	Mass Control	Self-Regulating	Mass Sensor	Mass Control	Mass Control
11	Volume Control	Self-Regulating	Volume Sensor	Volume Control	Volume Control
12	Area Control	Self-Regulating	Area Sensor	Area Control	Area Control
13	Length Control	Self-Regulating	Length Sensor	Length Control	Length Control
14	Width Control	Self-Regulating	Width Sensor	Width Control	Width Control
15	Height Control	Self-Regulating	Height Sensor	Height Control	Height Control
16	Depth Control	Self-Regulating	Depth Sensor	Depth Control	Depth Control
17	Weight Control	Self-Regulating	Weight Sensor	Weight Control	Weight Control
18	Volume Control	Self-Regulating	Volume Sensor	Volume Control	Volume Control
19	Area Control	Self-Regulating	Area Sensor	Area Control	Area Control
20	Length Control	Self-Regulating	Length Sensor	Length Control	Length Control

Table 1
Soil Boring/Monitoring Well Specifications
Johnson + Johnston Associates, Inc.
Hampstead, New Hampshire
Project No. 00-002

Boring/ Well ID	Total Boring Depth (feet) ^[1]	Depth Bedrock Encountered (feet) ^[1]	Total Well Depth (feet) ^[1]	Screened Interval (feet) ^[1]	Filter Sand Interval (feet) ^[1]	Well Seal (feet) ^[1]
ATC-2 ^[2]	36.0	7.5	36.0	26 to 36	25 to 36	1 to 25
ATC-3 ^[2]	19.3	NE	19.0	9 to 19	8 to 19	6 to 8
ATC-4-1 ^[2]	10	NE	10	5 to 10	4 to 10	2 to 4
ATC-4-2 ^[2]	13	NE	13	3 to 13	2.5 to 13	1 to 2.5
ATC-4A ^[2]	3	NE	NA	NA	NA	NA
ATC-4B ^[2]	9	NE	NA	NA	NA	NA
ATC-4C ^[2]	11	NE	NA	NA	NA	NA
ATC-4D ^[2]	6	NE	NA	NA	NA	NA
CJ-1 ^[3]	35.5	4	36	20.5 to 35.5	20 to 35.5	4 to 20
CJ-2 ^[3]	30	7	30	10 to 30	8.5 to 30	3 to 8.5
CJ-3 ^[3]	30.5	10	31	15.5 to 30.5	0.5 to 5 and 13 to 30.5	5 to 13
CJ-4S ^[3]	45	32	25.5	10.5 to 25.5	1 to 2 and 7 to 25.5	2 to 7
CJ-4D ^[3]	50	34.5	50	40 to 50	38 to 50	28 to 38

Notes:

NGVD = National Geodetic Vertical Datum of 1929.

NA - Not applicable since only soil boring; no monitoring well installed.

NE - Not established or verified.

[1] - Feet below ground surface

[2] - Completed by Environmental Drilling, Inc. for ATC Associates Inc.

[3] - Completed by New Hampshire Boring, Inc. for Cushing & Jammallo, Inc.

Table 2
Depth to Water and Groundwater Elevation
Johnson + Johnston Associates, Inc.
Hampstead, New Hampshire
Project No. 00-002

Boring/ Well ID	Water Level Gauging Date	Measuring Point Elevation ¹ (NGVD)	Depth to Water (feet) ²	Groundwater Elevation
ATC-2	11/23/99	224.43	29.80	194.63
	6/14/00	228.52	24.02	204.50
	7/20/00	228.52	25.68	202.84
ATC-3	11/23/99	219.22	14.45	204.77
	6/14/00	219.15	14.79	204.36
	7/20/00	219.15	15.17	203.98
ATC-4-1	11/23/99	220.79	9.50	211.20
ATC-4-2	11/23/99	221.12	8.68	212.44
	6/14/00	220.99	6.54	214.45
	7/20/00	220.99	7.10	213.89
CJ-1	6/14/00	217.70	12.95	204.75
	7/20/00	217.70	15.41	202.29
CJ-2	6/14/00	233.72	17.52	216.20
	7/20/00	233.72	19.67	214.05
CJ-3	6/14/00	220.29	7.00	213.29
	7/20/00	220.29	8.19	212.10
CJ-4S	6/14/00	NA	14.95	NA
	7/20/00	225.23	14.88	210.35
CJ-4D	6/14/00	NA	20.38	NA
	7/20/00	225.48	21.03	204.45

Notes:

1 - Measuring Point Elevation = Top of PVC Casing

2 - Feet below ground surface

NGVD = National Geodetic Vertical Datum of 1929.

Table 3
Summary of Water Quality Field Testing Results for Supply Wells
Johnson + Johnston Associates, Inc.
Hampstead, New Hampshire
Project No. 00-002

Supply Well ID	Time	pH	Temperature (°C)	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/l)	Oxidation/Reduction Potential (mV)
June 15, 2000						
Supply Well 1 ^[2] [5]	1:43 PM	5.91	11.39	0.753	1.30	161
Supply Well 2 ^[1] [3]	11:23 AM	6.29	11.73	0.338	0.82	101
Supply Well 3 ^[1] [3]	12:00 PM	7.27	11.22	0.196	9.24	127
Alliant Well ^[1] [4]	12:30 PM	6.39	10.83	0.323	0.53	74
July 20, 2000						
Alliant Well ^[1] [4]	2:59 PM	6.02	11.86	0.3556	3.40	199
	3:04 PM	5.88	11.25	0.3558	1.38	203
	3:09 PM	5.88	10.97	0.3552	0.98	201
	3:12 PM	5.89	10.98	0.3542	1.29	201

Notes:

pH in standards units

°C = degrees Centigrade

mS/cm = milliSeimens per centimeter

mg/l = milligrams per liter

mV = millivolts

[1] = Well already pumping prior to sampling

[2] = Well pumped for approximately 60 minutes at 5 gallons per minute (total approx. 300 gal.) prior to sampling

[3] = Sample collected from exterior tap

[4] = Sample collected from interior tap

[5] = Sample collected from tap connected to piping at well

Table 4
Monitoring Well ATC-4-2
Summary of Water Quality Field Testing Results
Johnson + Johnston Associates, Inc.
Hampstead, New Hampshire
Project No. 00-002

Time	pH	Temperature (°C)	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/l)	Oxidation/Reduction Potential (mV)
June 14, 2000 ^[1]					
2:30 PM	6.05	11.60	1.245	5.11	177
2:32 PM	5.99	11.47	1.282	1.47	179
2:34 PM	6.07	11.92	1.302	0.86	180
2:36 PM	6.08	12.06	1.311	0.59	182
2:38 PM	6.09	11.98	1.312	0.47	184
2:44 PM	6.13	13.39	0.201	0.30	185
July 20, 2000 ^[2]					
2:20 PM	5.61	14.13	1.159	6.86	385
2:25 PM	5.64	14.34	1.155	7.26	389

Notes:

pH in standard units

°C = degrees Centigrade

mS/cm = millisiemens per centimeter

mg/l = milligrams per liter

mV = millivolts

Intake of pump set at 10 feet.

Well purged and sampled with peristaltic pump

[1] = Well pumped for approximately 30 minutes prior to recording these measurements.

[2] = Well pumped for approximately 60 minutes prior to recording these measurements.

Table 5
Summary of Water Quality Field Testing Results for Monitoring Well CJ-1
Johnson + Johnston Associates, Inc.
Hampstead, New Hampshire
Project No. 00-002

Time	pH	Temperature (°C)	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/l)	Oxidation/Reduction Potential (mV)
June 5, 2000					
8:29 AM	5.51	10.69	0.290	4.13	173
8:31 AM	5.44	10.83	0.288	3.72	177
8:33 AM	5.38	10.93	0.286	3.54	181
8:35 AM	5.34	10.99	0.285	3.47	186
8:37 AM	5.30	11.00	0.287	3.38	191
8:39 AM	5.30	11.05	0.286	3.34	194
8:41 AM	5.30	11.04	0.288	3.33	196
8:43 AM	5.30	11.04	0.287	3.30	199
8:46 AM	5.30	11.26	0.289	3.41	204
8:50 AM	5.27	11.20	0.289	3.21	208
July 20, 2000					
9:14 AM	5.08	12.17	0.2124	5.73	419
9:16 AM	4.97	11.39	0.2152	2.83	421
9:19 AM	4.96	11.19	0.2147	2.70	423
9:24 AM	4.96	11.09	0.2144	2.54	426
9:28 AM	4.98	11.14	0.2129	2.62	425
9:30 AM	4.98	11.11	0.2126	2.49	426
9:32 AM	4.98	11.11	0.2115	2.48	427

Notes:

pH in standards units

°C = degrees Centigrade

mS/cm = milliSiemens per centimeter

mg/l = milligrams per liter

mV = millivolts

Intake of pump set at approximately 30 feet.

Well purged and sampled with Grundfos RediFlo 2

Table 6
Summary of Water Quality Field Testing Results for Monitoring Well CJ-2
Johnson + Johnston Associates, Inc.
Hampstead, New Hampshire
Project No. 00-002

Time	pH	Temperature (°C)	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/l)	Oxidation/Reduction Potential (mV)
June 15, 2000					
9:24 AM	5.78	9.37	0.251	7.30	150
9:27 AM	5.30	9.73	0.224	7.59	172
9:30 AM	5.24	9.81	0.237	7.11	181
9:33 AM	5.16	9.98	0.231	7.24	193
9:36 AM	5.15	10.12	0.235	7.14	201
9:39 AM	5.15	10.15	0.237	7.04	208
9:42 AM	5.15	10.27	0.239	7.04	212
9:45 AM	5.16	10.27	0.240	6.92	217
July 20, 2000					
10:20 AM	5.28	10.95	0.3157	4.83	403
10:24 AM	4.99	11.13	0.2207	5.65	430
10:27 AM	4.95	11.62	0.2116	5.58	444
10:31 AM	4.93	11.69	0.2109	5.53	455
10:35 AM	4.91	11.87	0.2109	5.51	465
10:40 AM	4.89	11.87	0.2134	5.39	473
10:44 AM	4.89	11.96	0.2150	5.28	477
10:46 AM	4.89	11.91	0.2152	5.29	479

Notes:

pH in standards units
°C = degrees Centigrade
mS/cm = milliSiemens per centimeter
mg/l = milligrams per liter
mV = millivolts
Intake of pump set at approximately 25 feet
Well purged and sampled with Grundfos RediFlo 2

Table 7
Summary of Water Quality Field Testing Results for Monitoring Well CJ-3
Johnson + Johnston Associates, Inc.
Hampstead, New Hampshire
Project No. 00-002

Time	pH	Temperature (°C)	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/l)	Oxidation/Reduction Potential (mV)
June 14, 2000					
1:20 PM	6.18	10.35	0.739	3.36	166
1:22 PM	5.88	11.09	0.796	1.84	171
1:24 PM	5.87	11.55	1.096	1.36	165
1:30 PM	6.26	11.67	0.720	2.95	143
1:34 PM	6.06	13.72	0.350	3.44	129
1:36 PM	6.04	14.98	1.146	3.56	112
1:42 PM	6.03	15.79	1.135	3.45	105
1:44 PM	6.07	15.28	1.103	4.86	111
2:02 PM	6.04	15.88	1.097	4.21	126
July 20, 2000					
1:40 PM	5.64	12.76	0.8086	1.02	296
1:45 PM	5.69	13.53	0.9160	0.76	281
1:50 PM	5.71	13.13	1.0570	0.95	307
1:55 PM	5.72	13.05	1.117	1.62	315
2:00 PM	5.77	13.04	1.119	2.17	327
2:02 PM	5.71	13.00	1.119	2.24	330
2:08 PM	5.71	12.92	1.112	2.32	336
2:13 PM	5.71	13.04	1.110	2.22	340

Notes:

pH in standards units

°C = degrees Centigrade

mS/cm = milliSeimens per centimeter

mg/l = milligrams per liter

mV = millivolts

Intake of pump set at 20 feet

Well purged and sampled with Grundfos RediFlo 2

Table 8
Summary of Water Quality Field Testing Results for Monitoring Well CJ-4S
Johnson + Johnston Associates, Inc.
Hampstead, New Hampshire
Project No. 00-002

Time	pH	Temperature (°C)	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/l)	Oxidation/Reduction Potential (mV)
June 14, 2000 ^{[1][2]}					
4:04 PM	6.23	12.98	0.708	2.01	166
4:04 PM	6.19	12.81	0.718	2.37	168
4:07 PM	6.21	12.82	0.696	2.13	170
4:09 PM	6.20	12.76	0.692	2.25	171
July 20, 2000 ^[3]					
12:36 PM	6.07	13.49	0.9360	2.25	273
12:40 PM	5.99	13.57	0.8751	0.49	290
12:45 PM	6.02	14.19	0.8297	0.37	294
12:50 PM	6.02	14.35	0.7894	0.38	292
12:55 PM	6.02	14.35	0.7716	0.38	299

Notes:

pH in standards units

°C = degrees Centigrade

mS/cm = milliSeimens per centimeter

mg/l = milligrams per liter

mV = millivolts

Intake of pump set at approximately 23 feet

[1] = Well purged with peristaltic pump 44 minutes prior to recording measurements

[2] = Peristaltic pumped used for sampling

[3] = Grundfos RediFlo 2 used for purging and sampling

Table 9
Monitoring Well CJ-4D
Summary of Water Quality Field Testing Results
Johnson Johnston Associates, Inc.
Hampstead, New Hampshire
Project No. 00-002

Time	pH	Temperature (°C)	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/l)	Oxidation/Reduction Potential (mV)
June 14, 2000 [1][2]					
3:27 PM	7.77	11.97	0.658	2.82	-159
3:29 PM	7.56	12.65	0.602	1.66	-181
3:31 PM	7.29	13.33	0.522	1.16	-185
3:36 PM	7.04	14.91	NR	1.04	NR
3:42 PM	6.90	15.97	0.404	2.88	-95
3:45 PM	6.76	15.72	0.121	2.37	-113
4:15 PM	6.65	11.83	0.388	3.44	38
4:18 PM	6.64	12.44	0.382	2.68	10
4:20 PM	6.60	13.21	0.391	1.74	-51
4:21 PM	6.62	13.54	0.392	1.73	-62
July 20, 2000 [1][3]					
11:37 AM	6.80	11.77	0.5972	8.91	194
11:41 AM	6.69	12.04	0.5732	1.19	196
11:45 AM	6.63	13.10	0.5209	0.59	202
12:02 PM	6.38	14.14	0.3856	0.35	197
12:06 PM	6.36	14.20	0.3654	0.32	196
12:14 PM	6.34	14.26	0.3534	0.30	196
12:21 PM	6.32	14.50	0.3595	0.29	196
12:25 PM	6.31	14.16	0.3709	0.31	196

Notes:

pH in standards units

°C = degrees Centigrade

mS/cm = milliSeimens per centimeter

mg/l = milligrams per liter

mV = millivolts

[1] = Well purged and sampled with Grundfos RediFlo 2

[2] = Intake of pump set at approximately 38 feet

[3] = Intake of pump set at approximately 45 feet

NR = No reading taken

Table 10
Matrix of Laboratory Testing Parameters for Groundwater
Site Investigation
Johnson + Johnston Associates, Inc.
Hampstead, New Hampshire
Project No. 00-002

Monitoring Well/Sample ID	Date Sampled	Laboratory Analysis							
		VOCs	Total Chloride	Nitrate-Nitrogen	Sulfate	Ferrous Iron	Soluble Manganese	Total Organic Carbon	Methane
Supply Well 1	6/15/00	X	X	X	X	X	X	X	X
Supply Well 2	6/15/00	X	X	X	X	X	X	X	X
Supply Well 3	6/15/00	X	X	X	X	X	X	X	X
Supply Well 3 DUP	6/15/00	X	X	X	X	X	X	X	X
Alliant Well	6/15/00	X	X	X	X	X	X	X	X
Alliant Well	7/20/00	X	NT	NT	NT	NT	NT	NT	NT
ATC-2	6/15/00	NT	NT	NT	NT	NT	NT	NT	NT
ATC-2	7/21/00	X	X	X	X	X	X	X	X
ATC-4-2	6/14/00	X	X	X	X	X	X	X	X
ATC-4-2	7/20/00	X	X	X	X	X	X	X	X
CJ-1	6/15/00	X	X	X	X	X	X	X	X
CJ-1	7/20/00	X	X	X	X	X	X	X	X
CJ-2	6/15/00	X	X	X	X	X	X	X	X
CJ-2	7/20/00	X	X	X	X	X	X	X	X
CJ-3	6/14/00	X	X	X	X	X	X	X	X
CJ-3 DUP	6/14/00	X	X	X	X	X	X	X	X
CJ-3	7/20/00	X	X	X	X	X	X	X	X
CJ-3 DUP	7/20/00	X	NT	NT	NT	NT	NT	NT	X
CJ-4S	6/14/00	X	X	X	X	X	X	X	X
CJ-4S	7/20/00	X	X	X	X	X	X	X	X
CJ-4D	6/14/00	X	X	X	X	X	X	X	X
CJ-4D	7/20/00	X	X	X	X	X	X	X	X

NOTES:

NT = Not tested or analyzed

"X" = Lab analysis performed for this parameter

VOCs = Volatile organic compounds plus tentatively identified compounds

DUP = Duplicate sample

Table 11
Summary of Laboratory Testing Results of Groundwater for VOCs
Johnson + Johnston Associates, Inc.
Hampstead, New Hampshire
Project No. 00-002

Sample ID	Date Sampled	Volatile Organic Compounds (ug/l)									
		1,1-Dichloroethene	1,1-Dichloroethane	1,1,1-Trichloroethane	Benzene	Acetone	Trichloroethene	Tetrachloroethene	Naphthalene		
Supply Well 1	11/19/99 ^[3]	22	51	100	2.0 U	10 U	2.0 U	2.0 U	2.0 U	2.0 U	U
Supply Well 1D	11/19/99 ^[3]	22	49	110	2.0 U	10 U	2.0 U	2.0 U	2.0 U	2.0 U	U
Supply Well 1	6/15/00 ^[4]	26	66	110	1.0 U	10 U	2.0 U	2.0 U	2.0 U	5.0 U	U
Supply Well 2	11/19/99 ^[3]	9.9	21	2.0 U	2.0 U	10 U	2.0 U	2.0 U	2.0 U	2.0 U	U
Supply Well 2	6/15/00 ^[4]	9.7	21	2.0 U	1.0 U	10 U	2.0 U	2.0 U	2.0 U	5.0 U	U
Supply Well 3	11/19/99 ^[3]	2.0 U	2.0 U	2.0 U	2.0 U	10 U	2.0 U	2.0 U	2.0 U	2.0 U	U
Supply Well 3	6/15/00 ^[4]	2.0 U	2.0 U	2.0 U	1.0 U	10 U	2.0 U	2.0 U	2.0 U	5.0 U	U
Supply Well 3 DUP	6/15/00 ^[4]	2.0 U	2.0 U	2.0 U	1.0 U	10 U	2.0 U	2.0 U	2.0 U	5.0 U	U
Alliant Well	6/15/00 ^[4]	2.0 U	2.0 U	2.0 U	1.0 U	10 U	2.0 U	2.0 U	2.0 U	5.0 U	U
Alliant Well	7/20/00 ^[4]	0.6 U	0.7 U	0.9 U	0.6 U	50.0 U	1.0 U	0.4 U	1.0 U	1.0 U	U
ATC-2	11/23/99 ^[3]	58	300 E	130	2.0 U	16	2.7	3.3	4.6		
ATC-2	7/21/00 ^[4]	130	324	621	1.6	50.0 U	12.6	5.5	1.0 U		
ATC-3	11/23/99 ^[3]	2.0 U	2.0 U	2.0 U	2.0 U	10 U	2.0 U	2.0 U	2.0 U	2.0 U	U
ATC-3D	11/23/99 ^[3]	2.0 U	2.0 U	2.0 U	2.0 U	10 U	2.0 U	2.0 U	2.0 U	2.0 U	U
ATC-4-2	11/23/99 ^[3]	2.0 U	13	5.3	2.0 U	10 U	9.1	2.0 U	2.0 U	2.0 U	U
ATC-4-2	6/14/00 ^[4]	1.0 U	18	4.9	1.0 U	10 U	2.0 U	2.0 U	2.0 U	5.0 U	U
ATC-4-2	7/20/00 ^[4]	0.6 U	3.6	0.9 U	0.6 U	50.0 U	1.0 U	0.4 U	1.0 U	1.0 U	U
CJ-1	6/15/00 ^[4]	1.0 U	2.0 U	2.0 U	1.0 U	10 U	2.0 U	2.0 U	2.0 U	5.0 U	U
CJ-1	7/20/00 ^[4]	0.6 U	0.7 U	0.9 U	0.6 U	50.0 U	1.0 U	0.4 U	1.0 U	1.0 U	U
CJ-2	6/15/00 ^[4]	1.0 U	2.0 U	2.0 U	1.0 U	10 U	2.0 U	2.0 U	2.0 U	5.0 U	U
CJ-2	7/20/00 ^[4]	0.6 U	0.7 U	0.9 U	0.6 U	50.0 U	1.0 U	0.4 U	1.0 U	1.0 U	U
CJ-3	6/14/00 ^[4]	1.0 U	21	5.9	1.0 U	10 U	2.0 U	2.0 U	2.0 U	5.0 U	U
CJ-3 DUP	6/14/00 ^[4]	1.0 U	23	6.6	1.0 U	10 U	2.0 U	2.0 U	2.0 U	5.0 U	U
CJ-3	7/20/00 ^[4]	0.6 U	5.4	0.9 U	0.6 U	50.0 U	1.0 U	0.4 U	1.0 U	1.0 U	U
CJ-3 DUP	7/20/00 ^[4]	0.6 U	3.8	0.9 U	0.6 U	50.0 U	1.0 U	0.4 U	1.0 U	1.0 U	U
CJ-4S	6/14/00 ^[4]	1.0 U	2.0 U	9.5	1.0 U	10 U	7.1	2.0 U	5.0 U	5.0 U	U
CJ-4S	7/20/00 ^[4]	1.6	1.0	16.0	0.6 U	50.0 U	16.8	0.4 U	1.0 U	1.0 U	U
CJ-4D	6/14/00 ^[4]	1.0 U	2.0 U	2.0 U	1.0 U	10 U	6.1	2.0 U	5.0 U	5.0 U	U
CJ-4D	7/20/00 ^[4]	2.9	5.0	9.4	0.6 U	50.0 U	13.8	0.4 U	1.0 U	1.0 U	U
Ambient Groundwater Quality Standard ^[1] / NH GW-1 ^[5]		7	81	200	5	700	5	5	20		
NH GW-2 ^[5]		1	9,000	4,000	2,000	50,000	300	3,000	6,000		

Notes:

[1] From Env-Wm 1403, NHDES "Groundwater Management and Groundwater Release Detection Permits", Table 1403-1 (February 24, 1999) or as updated from NHDES rule making.

[2] For mixed isomers.

[3] Sampled by ATC Associates Inc.

[4] Sampled by Cushing & Jammallo, Inc.

[5] From NHDES "Contaminated Sites Risk Characterization and Management Policy", Table 2, January 1998.

[6] Standard reported for group of compounds known as alkylbenzenes where sum total of compounds is compared to standard.

ug/l = micrograms per liter.

Those concentrations in **bold italics** are equal to or exceed applicable laboratory Reporting Limit.

Those concentrations in **bold italics** and shaded exceed applicable NHDES Ambient Groundwater Quality Standard /NH GW-1 and/or NH GW-2.

NA = Not applicable.

NS = No standard established by NHDES.

Supply Well 1D is duplicate of Supply Well 1; Supply Well 3 DUP is duplicate of Supply Well 3; ATC-3D is duplicate of ATC-3; CJ-3 DUP is duplicate of CJ-3.

Only VOCs reported by the laboratory above its applicable Reporting Limits are presented in this table.

E = Reporting limit for this analyte was elevated by the laboratory due to sample dilution.

U = Not detected in concentration at or above laboratory's reporting limits.

Table 11
Summary of Laboratory Testing Results of Groundwater for VOCs
Johnson + Johnston Associates, Inc.
Hampstead, New Hampshire
Project No. 00-002

Sample ID	Date Sampled	Volatile Organic Compounds (ug/l)									
		Chloro-ethane	cis-1,2-Dichloroethene	m & p-Xylenes	o-Xylene	1,4-Dichloro-benzene	1,2,4-Trimethylbenzene	Vinyl Chloride	Methyl-tert-butyl-ether (MTBE)		
Supply Well 1	11/19/99 ^[3]	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	17	
Supply Well 1D	11/19/99 ^[3]	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	17	
Supply Well 1	6/15/00 ^[4]	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	15	
Supply Well 2	11/19/99 ^[3]	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	23	
Supply Well 2	6/15/00 ^[4]	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	25	
Supply Well 3	11/19/99 ^[3]	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	
Supply Well 3	6/15/00 ^[4]	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	
Supply Well 3 DUP	6/15/00 ^[4]	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	
Alliant Well	6/15/00 ^[4]	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	23	
Alliant Well	7/20/00 ^[4]	0.8 U	0.5 U	1.3 U	0.5 U	0.8 U	0.7 U	0.3 U	12.6		
ATC-2	11/23/99 ^[3]	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.6	2.0 U	8.8		
ATC-2	7/21/00 ^[4]	0.8 U	0.5 U	1.3 U	0.5 U	0.8 U	0.7 U	3.2	1.8		
ATC-3	11/23/99 ^[3]	5.0 U	2.0 U	2.0 U	2.0 U	2.2	2.0 U	2.0 U	2.0 U		
ATC-3D	11/23/99 ^[3]	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U		
ATC-4-2	11/23/99 ^[3]	5.0 U	12	2.1	2.0 U	2.0 U	2.0 U	2.0 U	9.1		
ATC-4-2	6/14/00 ^[4]	8.0	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	6.8		
ATC-4-2	7/20/00 ^[4]	0.8 U	0.5 U	1.3 U	0.5 U	0.8 U	0.7 U	0.3 U	6.8		
CJ-1	6/15/00 ^[4]	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	1.0 U	2.0 U	2.0 U		
CJ-1	7/20/00 ^[4]	0.8 U	0.5 U	1.3 U	0.5 U	0.8 U	0.7 U	0.3 U	0.8 U		
CJ-2	6/15/00 ^[4]	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U		
CJ-2	7/20/00 ^[4]	0.8 U	0.5 U	1.3 U	0.5 U	0.8 U	0.7 U	0.3 U	0.8 U		
CJ-3	6/14/00 ^[4]	8.6	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	6.5		
CJ-3 DUP	6/14/00 ^[4]	9.5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	6.2		
CJ-3	7/20/00 ^[4]	0.8 U	0.5 U	1.3 U	0.5 U	0.8 U	0.7 U	0.3 U	4.8		
CJ-3 DUP	7/20/00 ^[4]	0.8 U	0.5 U	1.3 U	0.5 U	0.8 U	0.7 U	0.3 U	5.3		
CJ-4S	6/14/00 ^[4]	5.0 U	14	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U		
CJ-4S	7/20/00 ^[4]	0.8 U	24.0	1.3 U	0.5 U	0.8 U	0.7 U	0.3 U	0.8 U		
CJ-4D	6/14/00 ^[4]	5.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2 U	2.0 U		
CJ-4D	7/20/00 ^[4]	0.8 U	0.5 U	1.3 U	0.5 U	0.8 U	0.7 U	0.3 U	0.8 U		
Ambient Groundwater Quality Standard ^[1] / NH GW-1 ^[5]		NS	70	10,000 ^[2]	10,000 ^[2]	75	50 ^[6]	2	13		
NH GW-2 ^[5]		NS	NA	6,000 ^[2]	6,000 ^[2]	30,000	NS ^[6]	2	50,000		

Notes:

[1] From Env-Wm 1403, NHDES "Groundwater Management and Groundwater Release Detection Permits", Table 1403-1 (February 24, 1999) or as updated from NHDES rule making.

[2] For mixed isomers.

[3] Sampled by ATC Associates Inc.

[4] Sampled by Cushing & Jammallo, Inc.

[5] From NHDES "Contaminated Sites Risk Characterization and Management Policy", Table 2, January 1998.

[6] Standard reported for group of compounds known as alkylbenzenes where sum total of compounds is compared to standard.

ug/l = micrograms per liter.

Those concentrations in **bold italics** are equal to or exceed applicable laboratory Reporting Limit.

Those concentrations in **bold italics** and shaded exceed applicable NHDES Ambient Groundwater Quality Standard /NH GW-1 and/or NH GW-2.

NA = Not applicable.

NS = No standard established by NHDES.

Supply Well 1D is duplicate of Supply Well 1; Supply Well 3 DUP is duplicate of Supply Well 3; ATC-3D is duplicate of ATC-3; CJ-3 DUP is duplicate of CJ-3.

Only VOCs reported by the laboratory above its applicable Reporting Limits are presented in this table.

= Reporting limit for this analyte was elevated by the laboratory due to sample dilution.

J = Not detected in concentration at or above laboratory's reporting limits.

Table 12
Summary of Laboratory Testing Results of Groundwater for VOCs
Tentatively Identified Compounds
Johnson + Johnston Associates, Inc.
Hampstead, New Hampshire
Project No. 00-002

Sample ID	Date Sampled	Volatile Organic Compounds (ug/l)		
		Trimethyl- Silanol	1,1-Dichloro-1- Fluoroethane	Chlorodifluoromethane
Supply Well 1	11/19/99 ^[3]	NR	NR	NR
Supply Well 1D	11/19/99 ^[3]	NR	NR	ND
Supply Well 1	6/15/00 ^[4]	ND	ND	ND
Supply Well 2	11/19/99 ^[3]	NR	NR	NR
Supply Well 2	6/15/00 ^[4]	ND	ND	ND
Supply Well 3	11/19/99 ^[3]	NR	NR	NR
Supply Well 3	6/15/00 ^[4]	ND	ND	ND
Supply Well 3 DUP	6/15/00 ^[4]	ND	ND	ND
Alliant Well	6/15/00 ^[4]	ND	ND	ND
Alliant Well	7/20/00 ^[4]	ND	ND	ND
ATC-2	11/23/99 ^[3]	NR	NR	NR
ATC-2	7/21/00 ^[4]	ND	D	D
ATC-3	11/23/99 ^[3]	NR	NR	NR
ATC-3D	11/23/99 ^[3]	ND	ND	ND
ATC-4-2	11/23/99 ^[3]	NR	NR	NR
ATC-4-2	6/14/00 ^[4]	ND	ND	ND
ATC-4-2	7/20/00 ^[4]	ND	ND	ND
CJ-1	6/15/00 ^[4]	ND	ND	ND
CJ-1	7/20/00 ^[4]	ND	ND	ND
CJ-2	6/15/00 ^[4]	ND	ND	ND
CJ-2	7/20/00 ^[4]	ND	ND	ND
CJ-3	6/14/00 ^[4]	4.3	J	ND
CJ-3 DUP	6/14/00 ^[4]	ND	ND	ND
CJ-3	7/20/00 ^[4]	ND	ND	ND
CJ-3 DUP	7/20/00 ^[4]	ND	ND	ND
CJ-4S	6/14/00 ^[4]	ND	ND	ND
CJ-4S	7/20/00 ^[4]	ND	ND	ND
CJ-4D	6/14/00 ^[4]	ND	ND	ND
CJ-4D	7/20/00 ^[4]	ND	ND	ND
Ambient Groundwater Quality Standard ^[1] / NH GW-1 ^[5]		NS	NS	NS
NH GW-2 ^[5]		NS	NS	NS

Notes:

[1] From Env-Wm 1403, NHDES "Groundwater Management and Groundwater Release Detection Permits",
Table 1403-1 (February 24, 1999) or as updated from NHDES rule making.

[3] Sampled by ATC Associates Inc.

[4] Sampled by Cushing & Jammallo, Inc.

[5] From NHDES "Contaminated Sites Risk Characterization and Management Policy", Table 2, January 1998.
ug/l = micrograms per liter.

Those concentrations in **bold italics** are equal to or exceed applicable laboratory Reporting Limit.

Those concentrations in **bold italics** and shaded exceed applicable NHDES Ambient Groundwater Quality
Standard /NH GW-1 and/or NH GW-2.

NA = Not applicable.

NS = No standard established by NHDES.

NR = TIC testing not requested.

ND = None detected by laboratory.

D = Detected by laboratory but concentration not quantified or estimated.

Supply Well 1D is duplicate of Supply Well 1; Supply Well 3 DUP is duplicate of Supply Well 3;

ATC-3D is duplicate of ATC-3; CJ-3 DUP is duplicate of CJ-3.

E = Reporting limit for his analyte was elevated by the laboratory due to sample dilution.

Methylene Chloride also identified in trip blank of 7/20/00 and 7/21/00.

J = Reporting concentration is estimated.

Table 13
Summary of Laboratory Testing Results of Groundwater for Natural Attenuation Parameters
Johnson + Johnston Associates, Inc.
Hampstead, New Hampshire
Project No. 00-002

Sample ID	Date Sampled	Testing Parameters						
		Total Chloride (mg/l)	Nitrate-Nitrogen (mg/l)	Sulfate (mg/l)	Iron (mg/l)	Manganese (mg/l)	Total Organic Carbon (mg/l)	Methane (mg/l)
Supply Well 1	6/15/00 ^[2]	190	0.24	32	21	2.7	1.4	0.005263
Supply Well 2	6/15/00 ^[2]	75	0.20 U	25	8.9	1.2	1.1	0.012954
Supply Well 3	6/15/00 ^[2]	6.0	0.20 U	24	0.1 U	0.16	1.2	0.0006 U
Supply Well 3 DUP	6/15/00 ^[2]	6.5	0.20 U	24	0.1 U	0.16	1.0 U	0.0006 U
Alliant Well	6/15/00 ^[2]	77	0.20 U	23	16	0.99	1.0 U	0.001571
ATC-2	7/21/00 ^[2]	838	0.05 U	38.0	7.55	5.76	43.2	0.0031
ATC-4-2	6/14/00 ^{[2]*}	180	<i>50</i>	60	0.1 U	4.9	3.8	0.00865
ATC-4-2	7/20/00 ^[2]	130	<i>66.1</i>	55.0	0.5 U	3.4	5.65	0.002 U
CJ-1	6/15/00 ^[2]	57	1.4	39	0.68	0.62	1.0 U	0.000643
CJ-1	7/20/00 ^[2]	31.5	1.23	50.0	0.5 U	0.328	2.46	0.002 U
CJ-2	6/15/00 ^[2]	26	<i>11</i>	27	0.1 U	0.75	2.3	0.0006 U
CJ-2	7/20/00 ^[2]	34.5	8.18	20.0	0.5 U	0.543	2.54	0.002 U
CJ-3	6/14/00 ^[2]	160	<i>42</i>	49	0.4	4.9	4.0 U	0.001086
CJ-3 DUP	6/14/00 ^[2]	150	<i>43</i>	54	0.44	4.9	3.6 E	0.001052
CJ-3	7/20/00 ^[2]	124	<i>66.1</i>	46.0	0.5 U	4.59	5.65	0.0095
CJ-3 DUP	7/20/00 ^[2]	NT	NT	NT	NT	NT	NT	0.010
CJ-4S	6/14/00 ^[2]	130	1.7	30	0.1 U	4.3	11.0	0.052226
CJ-4S	7/20/00 ^[2]	77.5	2.04	26.0	0.5 U	3.54	91.9	0.320
CJ-4D	6/14/00 ^[2]	77	2.5	29	3.9	0.95	1.0 U	0.001974
CJ-4D	7/20/00 ^[2]	68.5	0.05 U	23.0	1.42	0.901	2.09	0.0023
Ambient Groundwater Quality Standard ^[1] / NH GW-1 ^[3]		NS	10	400	NS	NS	NS	NS
NH GW-2 ^[3]		NS	NS	NS	NS	NS	NS	NS

Notes:

[1] From Env-Wm 1403, NHDES "Groundwater Management and Groundwater Release Detection Permits", Table 1403-1 (February 24, 1999).

[2] Sampled by Cushing & Jammallo, Inc.

[3] From NHDES "Contaminated Site Risk Characterization and Management Policy", Table 2, January 1998.

mg/l = milligrams per liter.

ug/l = micrograms per liter.

Those concentrations in ***bold italics*** and shaded exceed applicable NHDES Ambient Groundwater Quality Standard.

NT = Not Tested

NS = No standard established by NHDES.

Supply Well 1D is duplicate of Supply Well 1; Supply Well 3 DUP is duplicate of Supply Well 3; ATC-3D is duplicate of ATC-3; CJ-3 DUP is duplicate of CJ-3.

E = Reporting limit for this analyte was elevated by the laboratory due to sample matrix.

U = Not detected in concentration at or above laboratory's reporting limits.

Table 14
Summary of Laboratory Testing Results of Septic Systems for VOCs
Johnson + Johnston Associates, Inc.
Hampstead, New Hampshire
Project No. 00-002

Sample ID	Date Sampled	Volatile Organic Compounds (ug/l)		
		Toluene	4-Isopropyltoluene	TICs
Septic-Oper	6/14/00 ^[1]	120	520	d-limonene (62 ug/l) J
Septic-Warehouse	6/14/00 ^[1]	34	500	None Identified
Septic-Warehouse Dup	6/14/00 ^[1]	34	530	None Identified

Notes:

[1] Sampled by Cushing & Jammallo, Inc.

ug/l = micrograms per liter.

Septic Warehouse Dup is duplicate of Septic-Warehouse.

Only VOCs reported by the laboratory above its applicable Reporting Limits are presented in this table.

J = reporting value of this analyte is estimated by the laboratory